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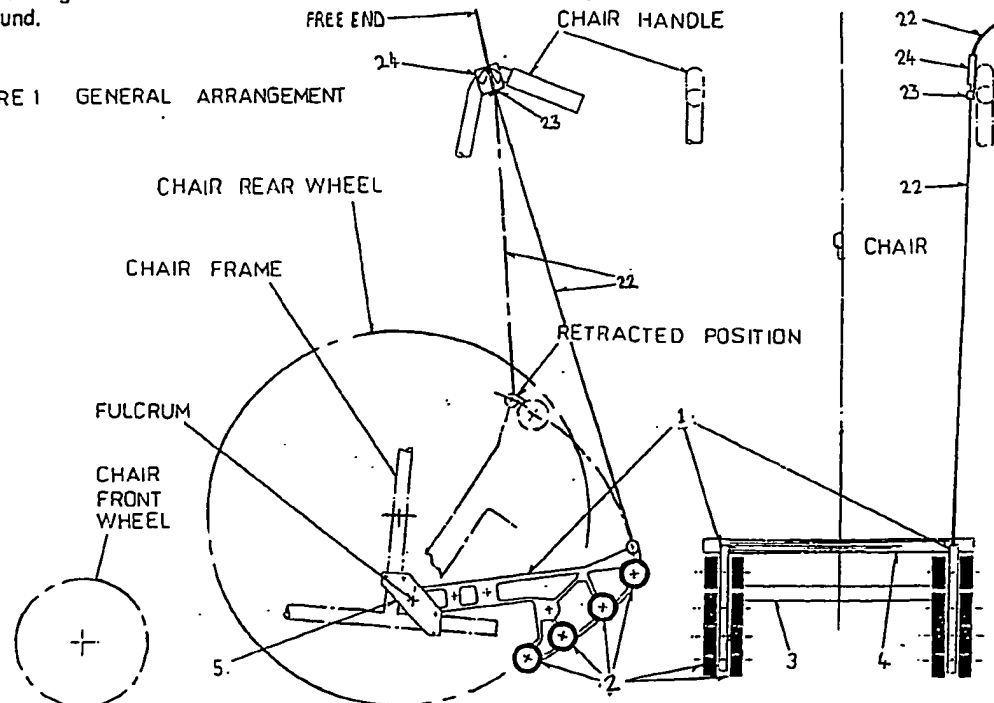
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(54) Kerb negotiator

(57) A kerb negotiator is a device which may be fixed to a wheelchair in order to help the pusher of the wheelchair raise the wheelchair up a kerb or similar obstacle, and consists preferably of two wheel arms 1 on which are mounted one or more sets of wheels 2. The whole assembly is secured to the wheelchair by means of mounting plates 5 which allow it to be pivoted by stepping on the foot bar 4. To use the device the wheelchair is first tilted back and the front wheels placed on the kerb with the rear wheels touching the kerb. The kerb negotiator is then lowered to the ground and the wheelchair pusher puts their weight onto the foot bar 4. This action causes the kerb negotiator to rotate further so lifting the rear wheels from the ground.

FIGURE 1 GENERAL ARRANGEMENT



At least one drawing originally filed was Informal and the print reproduced here is taken from a later filed formal copy.

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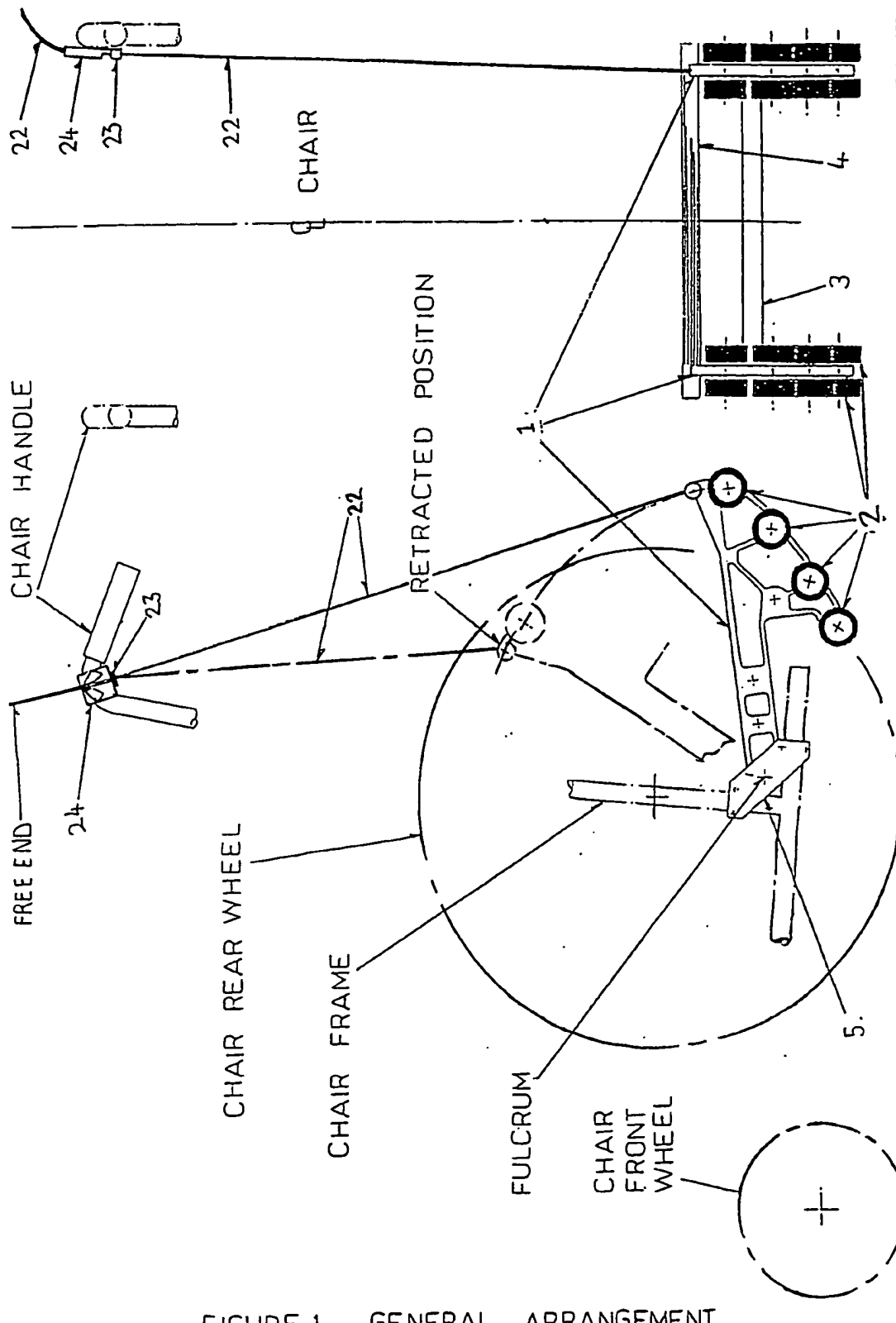
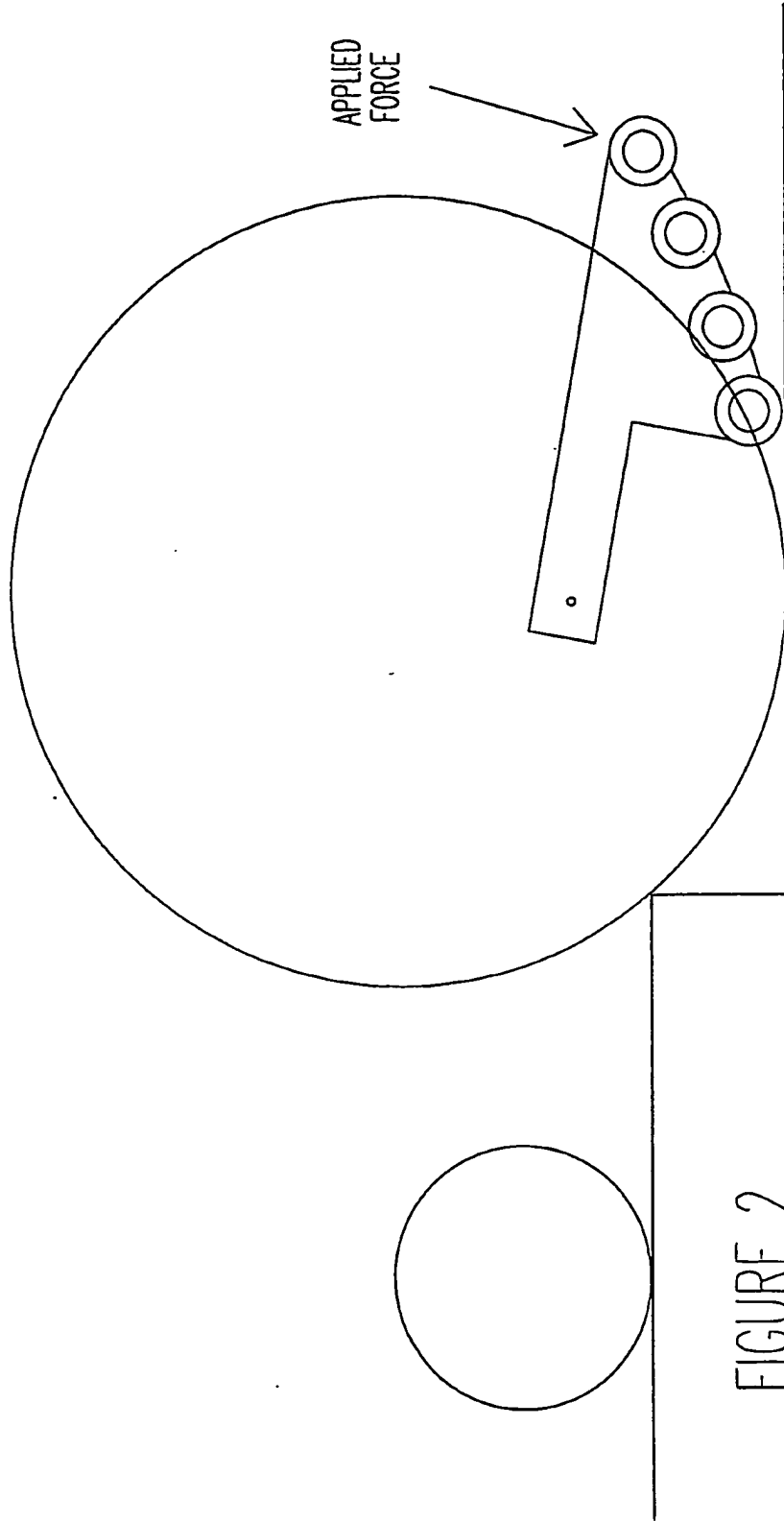


FIGURE 1 GENERAL ARRANGEMENT



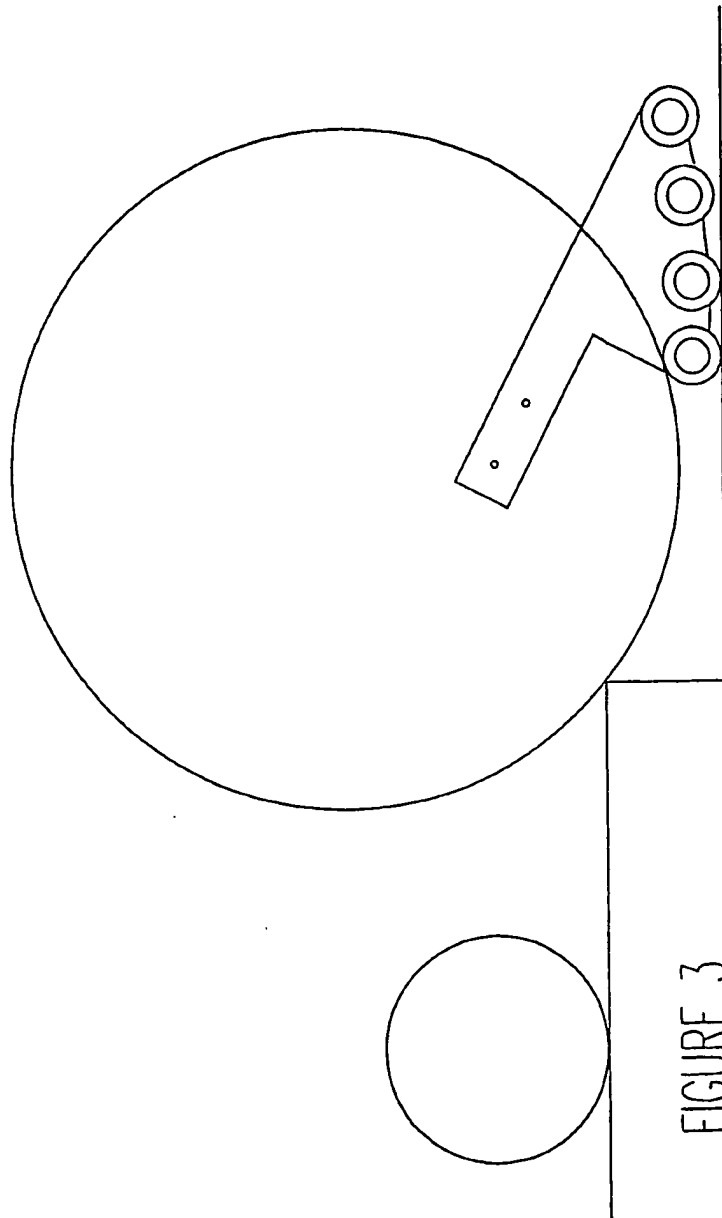
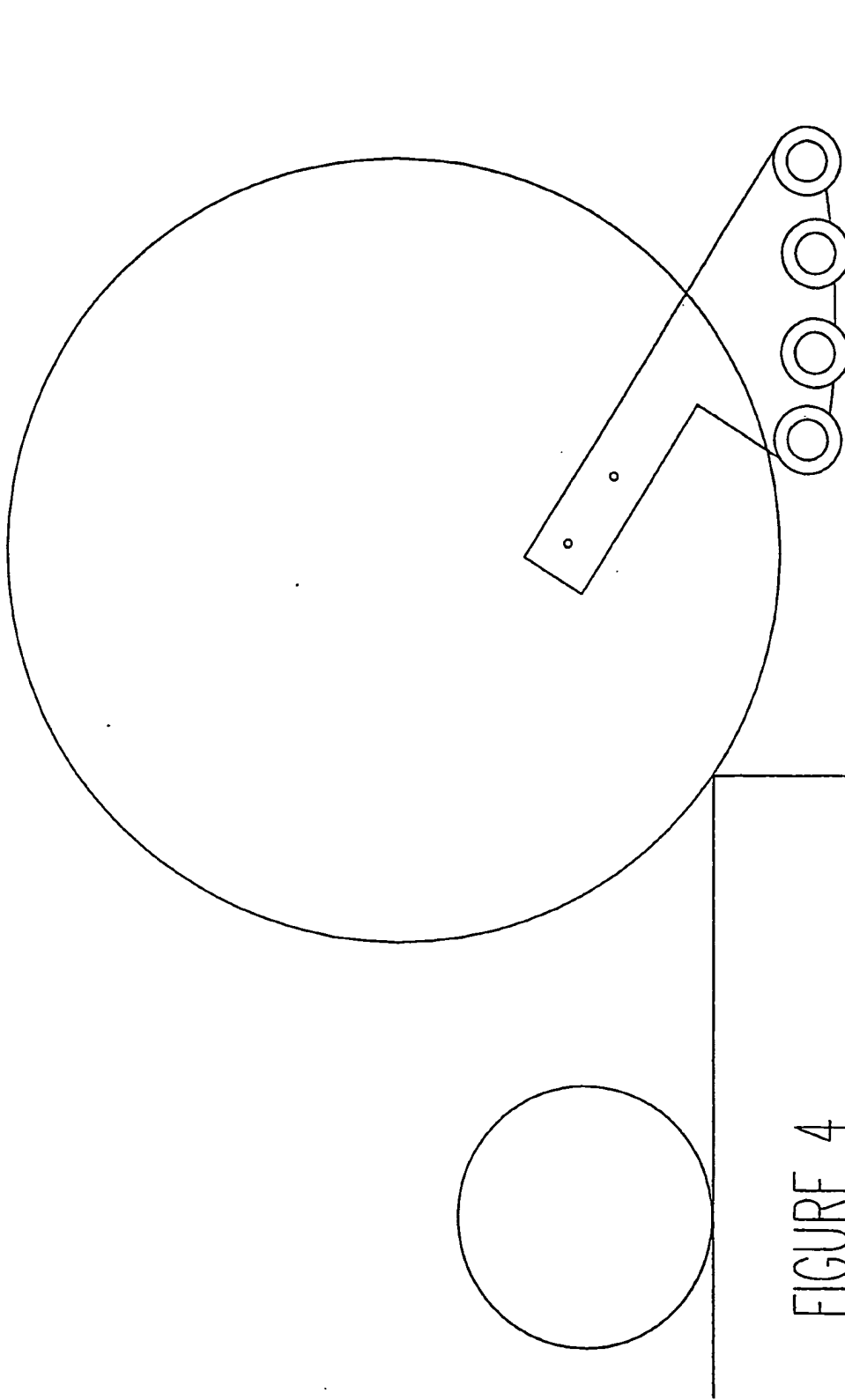
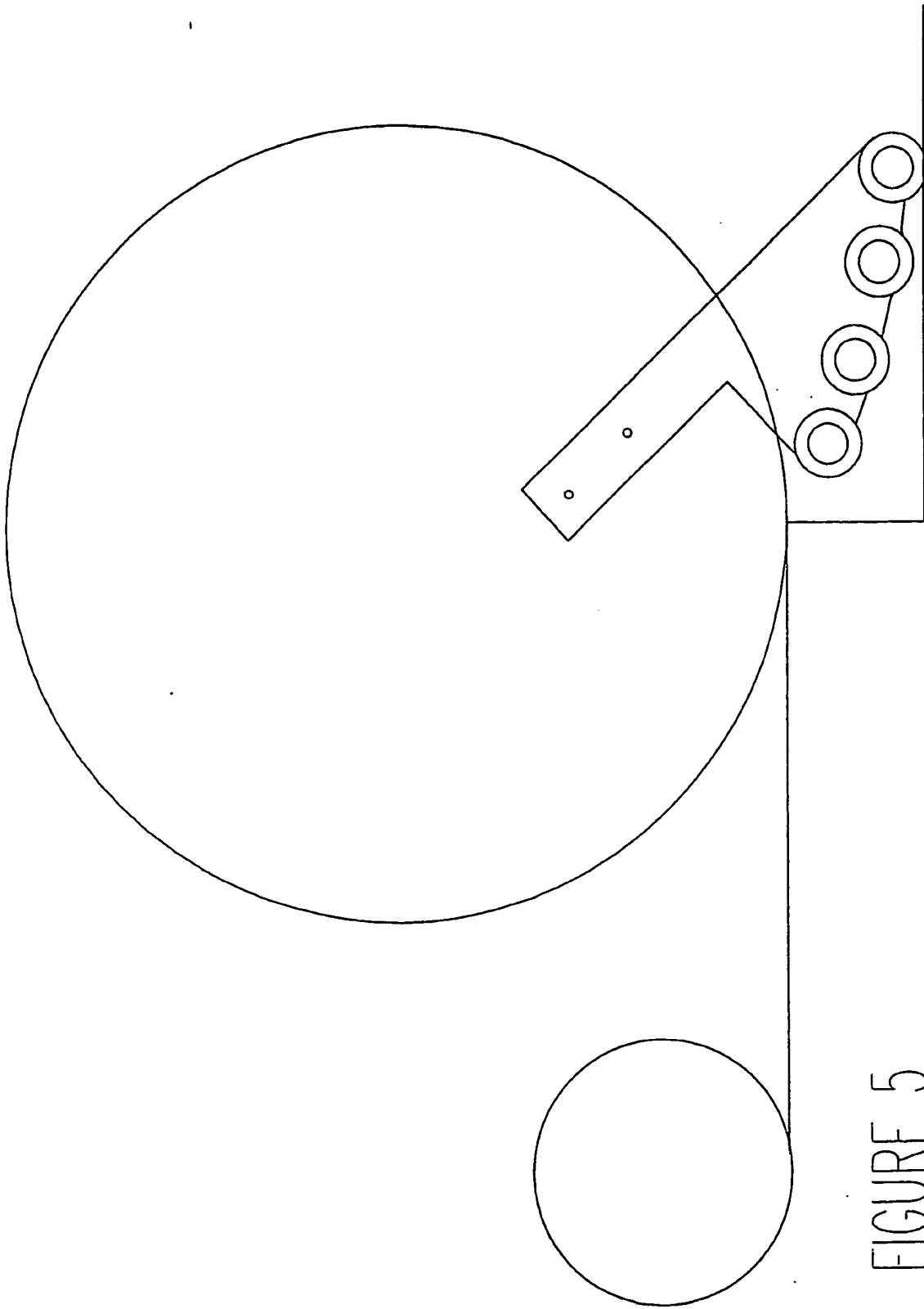


FIGURE 3

FIGURE 4

FIGURE 5

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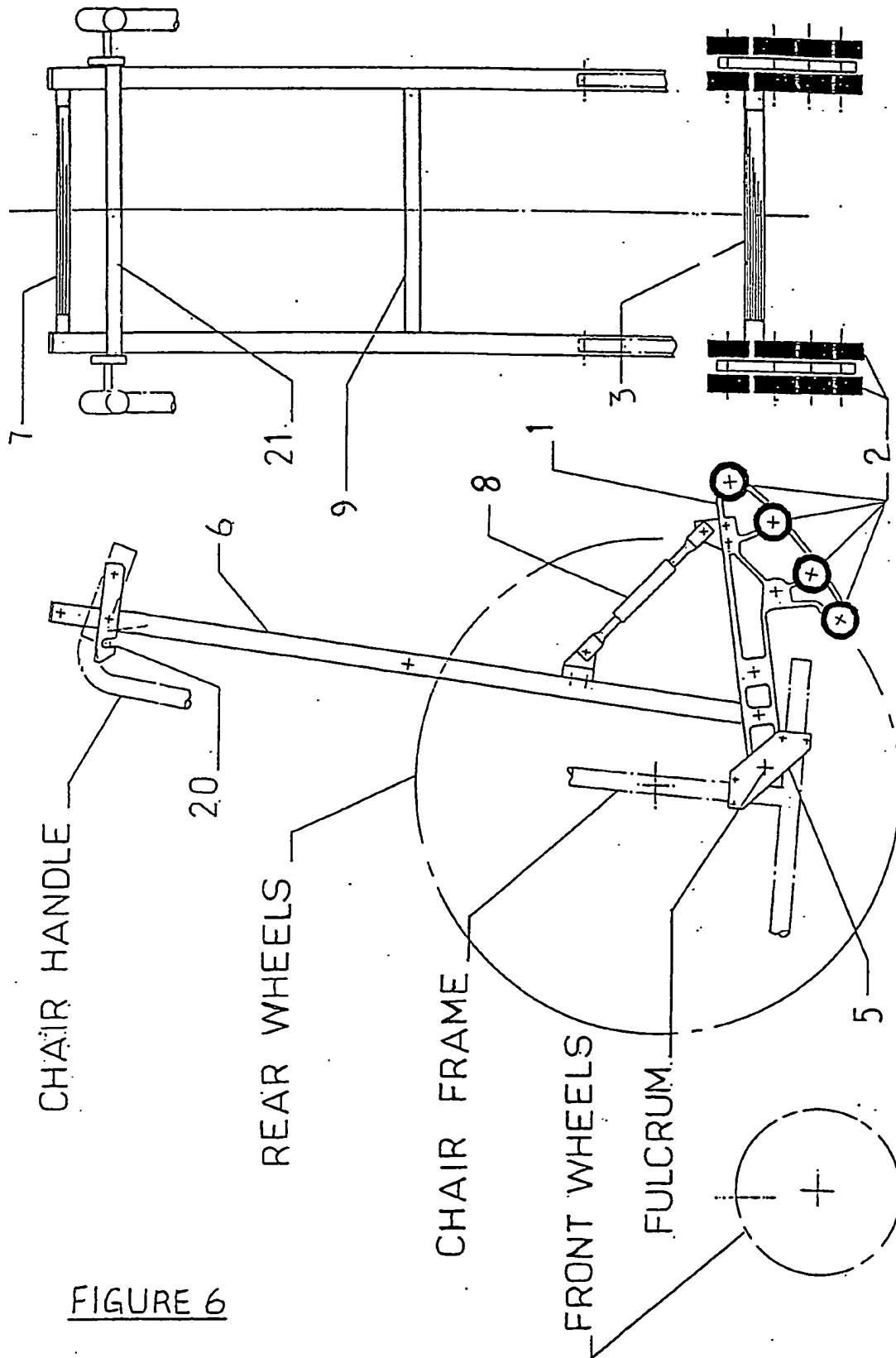


FIGURE 6

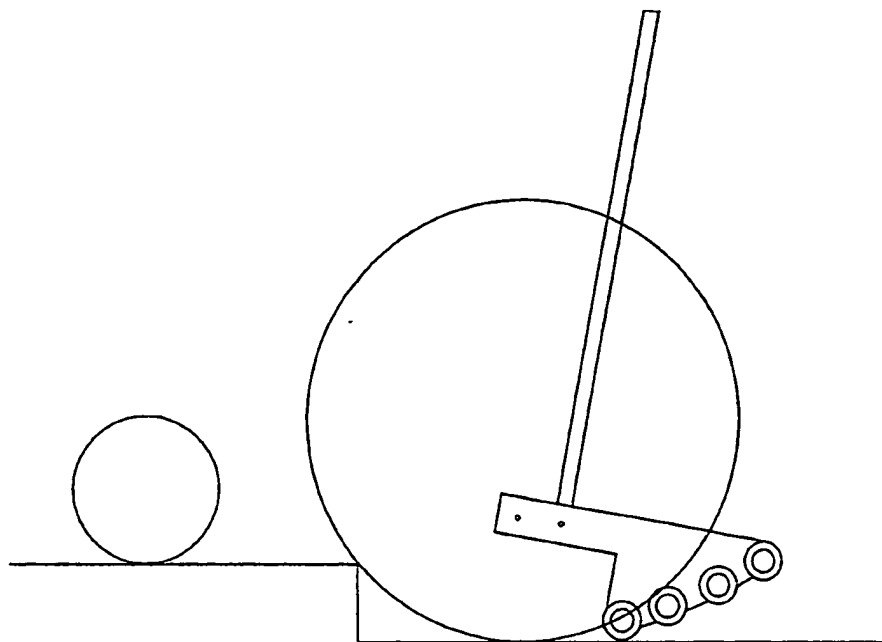


FIGURE 7

KERB NEGOTIATOR

This invention relates to a kerb negotiating device for a wheelchair.

Medical journals have cited one of the main problems faced by people pushing wheelchairs as being the difficulty in lifting the wheelchair up a kerb or similar obstacle. Even if the chair is tilted back and the front wheels lifted onto the kerb first, raising the back wheels represents an almost dead lift to the chair pusher, the majority of whom are elderly.

Specific embodiments of the invention will now be described by way of example with reference to the accompanying drawing in which:-

Figure 1 shows a general assembly of the first embodiment of the kerb negotiator as attached to the chair. For clarity it is not shown in its retracted position but this is indicated.

Figure 2 shows the wheelchair tilted back prior to a lift with the kerb negotiator lowered such that the first wheels in are in contact with the road.

Figure 3 shows the wheelchair when the second wheels have taken over the lifting from the first wheels.

Figure 4 shows the wheelchair when the third wheels have taken over the lifting from the second wheels.

Figure 5 shows the wheelchair when the fourth wheels have completed the lift.

Figure 6 shows a general assembly of a second embodiment of the kerb negotiator as attached to the chair and shown in its retracted position.

Figure 7 shows the wheelchair tilted back prior to a lift as figure 2 but for the second embodiment of the kerb negotiator.

Referring to the drawing of Figure 1, the kerb negotiator comprises principally two wheel arms 1. Each wheel arm has four sets (pairs) of wheels 2, the set nearest to the handle arms will be referred to as the 'first wheels', the set furthest from the handle arms will be referred to as the 'fourth wheels', and the intermediate sets of wheels will be referred to as the 'second wheels' and 'third wheels' in order. The two wheel arms are preferably held a fixed distance apart by a rigid bar 3, and a further rigid bar 4 which also serves as a step during the lift and which will be referred to as the 'foot bar'. The kerb negotiator is attached to the chair preferably by means of a fixing plates 5 or by some other suitable method so that the kerb negotiator may be rotated relative to the wheelchair about the fulcrum points on the wheelarms. Preferably the fixing plates shall incorporate a quick release spindle or other mechanism (not

shown) enabling the kerb negotiator to be wholly or partially removed from from wheelchair so as to facilitate wheelchair stowage. Preferably when not in use the kerb negotiator is releasably held in a retracted position by some form of securing mechanism which preferably allows the kerb negotiator to be quickly released, gently lowered and subsequently easily restowed. Such a mechanism might consist of a chord 22 secured at one end to one of the wheel arms, the other end passing through a guide 23 and secured by a jamming cleat 24 (such as might be bought from a yacht chandlers) both of which are themselves secured to the chair handle.

In order to use the kerb negotiator, for example to lift the wheelchair up a kerb from a road onto a pavement, the wheelchair is first tilted backwards and the front wheels of the wheelchair are placed on the pavement with the rear wheels of the wheelchair touching the kerb. The kerb negotiator is then released from its retracted position and lowered such that the 'first wheels' rest on the ground as shown in Figure 2. The pusher holds the wheelchair handles as if to perform a normal lift. The pusher then places one foot onto the 'foot bar' and puts his/her weight on it causing the wheel arms to rotate further about the fulcrum and the rear wheels of the wheelchair to lift off the ground. The pusher's weight is 'amplified' by the lever formed by the foot bar and wheels (wheel arm), the mechanical advantage given at this stage being approximately the ratio of the distance between the wheel arm fulcrum and the foot bar to the distance between the wheel arm fulcrum and the 'first wheels'.

As the wheel arms rotate further due to the pusher's weight the 'second wheels' will come into contact with the ground as shown in Figure 3. At this stage the mechanical advantage has reduced slightly since the distance between the fulcrum and the 'second wheels' is greater than the distance between the fulcrum and the 'first wheels', but the maximum height through which the rear wheels of the wheelchair may be lifted is increased. Continued rotation of the wheel arms will subsequently bring the 'third wheels' into play, as shown in Figure 4, and finally the 'fourth wheels' if the height of the kerb demands, as shown in Figure 5. As each new set of wheels comes into contact with the ground the mechanical advantage is reduced but the maximum lift height is increased.

Throughout the course of the lift the pusher holds onto the wheelchair handles so as to steady the wheelchair and provide any extra effort that might be required.

A second embodiment of the kerb negotiator will now be described.

Referring to the drawing of Figure 6, the kerb negotiator comprises wheel arms 1, wheels 2, preferably rigid bar 3, and fixing plates 5 as previously described in the first embodiment. Rigid bar 4 is not preferred in this embodiment as its presence may obstruct the wheelchair pusher's leg movements when pushing the wheelchair with the kerb negotiator in a retracted position. In this example two handle arms 6 and a handle 7 have been added. The handle arms are

rigidly held at a constant angle to the wheel arms. The angle between the handle arms and the wheel arms may be permanently fixed or adjustable, for example by means of turnbuckles 8. Preferably a rigid bar 9 is used to stiffen the handle assembly. When not in use the kerb negotiator is preferably releasably held in a retracted position by some form of securing mechanism which will preferably allow the kerb negotiator to be quickly released and subsequently easily restowed. In this example the kerb negotiator is secured by means of a latch 20 which is released by pressing down on the latch arm 21 and restowed by pushing the kerb negotiator forward into its stowed position whereupon the latch automatically secures it.

In order to use the kerb negotiator, for example to lift the wheelchair up a kerb from a road onto a pavement, the wheelchair is first tilted backwards and the front wheels of the wheelchair are placed on the pavement with the rear wheels of the wheelchair touching the kerb. The kerb negotiator is then released from its retracted position and rotated by pulling back on the handle until the 'first wheels' are brought into contact with the ground as shown in Figure 7. Pulling back further on the handle arm causes the rear wheels of the wheelchair to lift off the ground. The mechanical advantage given at this stage is approximately the ratio of the distance between the wheel arm fulcrum and the top of the handle arm to the distance between the wheel arm fulcrum and the 'first wheels'.

The remainder of the lift is as described in the first embodiment except that the wheel arms are rotated by pulling back further on the handle, and the mechanical advantage is approximately the ratio of the distance between the wheel arm fulcrum and the top of the handle arm to the distance between the wheel arm fulcrum and the wheels in currently contact with the ground.

In both embodiments the sets of wheels are positioned along the wheel arms so as to provide a reasonably smooth transition from one set of wheels to the next over a range of step sizes. Whilst these examples of kerb negotiator have four sets of wheels per wheel arm other versions may have more sets of wheels or less sets of wheels. Greater numbers of wheels, especially if covered with a track, provide for a smoother transition from one set of wheels to the next, ultimately forming a smooth profile giving a continuously variable mechanical advantage.

CLAIMS

- 1 A kerb negotiating device comprising at least one arm on which is mounted at least one wheel or roller, the arm being secured to the wheelchair in such a manner that a wheel or roller may be brought into contact with the ground beneath the wheelchair and through further pivoting lift the rear wheels from the ground.
- 2 A kerb negotiating device as claimed in Claim 1 wherein an arm has two or more wheels or rollers arranged so as to provide a varying mechanical advantage throughout the lift.
- 3 A kerb negotiating device as claimed in Claim 1 or Claim 2 wherein the wheels or rollers on an arm are covered by a belt or track.
- 4 A kerb negotiating device as claimed in Claim 1 or Claim 2 or Claim 3 wherein an arm may be releasably secured in a retracted position.
- 5 A kerb negotiating device as claimed in Claim 4 wherein an arm may be gently lowered from a retracted position.
- 6 A kerb negotiating device as claimed in Claim 5 wherein the securing mechanism consists of a chord secured at one end to an arm the other end passing through a jamming cleat which is preferably secured to the wheelchair handle.
- 7 A kerb negotiating device as claimed in Claim 6 wherein the chord passes through a guide which is preferably secured to the wheelchair handle.
- 8 A kerb negotiating device as claimed in any preceding claim wherein a handle is attached to an arm in order that the arm may be pivoted.
- 9 A kerb negotiating device as claimed in any preceding claim wherein the lifting energy is provided in whole or in part by electrical, hydraulic or pneumatic means.
- 10 A kerb negotiating device as claimed in any preceding claim wherein the kerb negotiating device may be collapsed or wholly removed or partially removed so as to facilitate wheelchair stowage.
- 11 A kerb negotiating device substantially as described herein with reference to Figures 1 to 6 of the accompanying drawings.

Patents Act 1977
Examiner's report to the Comptroller under
Section 17 (The Search Report)

Application number

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Relevant Technical fields

(i) UK CI (Edition K) B7D (DNS)

(ii) Int CI (Edition 5) A61G 5/06; B62B 5/02, 9/02

Databases (see over)

(i) UK Patent Office

(ii)

Search Examiner

COLIN THOMPSON

Date of Search

12 MARCH 1992

Documents considered relevant following a search in respect of claims

1-11

| Category (see over) | Identity of document and relevant passages | Relevant to claim(s) |
|------------------------|---|-------------------------|
| X | GB 2096074 A (TAYLOR) whole document relevant | 1,3,4,8 |
| X | 090205 A (ELLZEY) see figure 3 | 1 |
| X | GB 1472072 (K.K. UMI) see figures 3-5 | 1,4,9 |
| X | GB 840771 (DERKACZ) whole document relevant | 1,2,4,6, 8,9 |
| X | US 3580591 (COFFEY) see figures 5 and 6 | 1,4 |
| X | US 3573877 (LOCKE) see figures 3 and 4 | 1,4,8 |

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